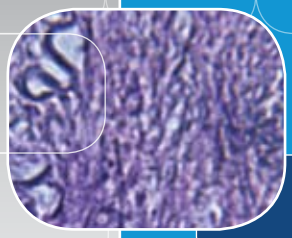


NEW!

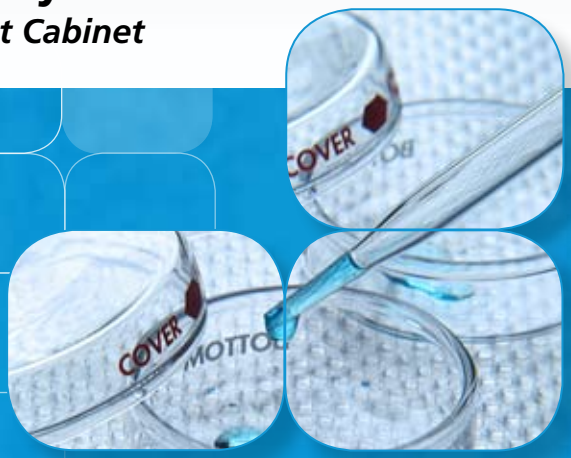
NordicSafe®

EN12469

NordicSafe Class II, Microbiological Safety Cabinet, Model NC2-4L8, with optional support stand.

Low Noise, Class II Microbiological Safety Cabinets

The Industry's Most Comfortable, Energy Efficient Cabinet



ESCO

WORLD CLASS. WORLDWIDE.

Main Features

- NEW extremely low energy consumption (190 Watt) for environmentally-conscious and budget-friendly operation.
- NEW latest generation, energy efficient ECM blower from EBM-Papst Germany maintains constant airflow, despite building voltage fluctuations.
- NEW quietest cabinet in industry (51 dBA), emulates soft noise of distant waterfalls, for serene working condition that helps to reduce fatigue and improves concentration.
- NEW Half Speed Mode reduces energy consumption to 80 Watt while still maintaining personnel and product protection when the cabinet is not being used.
- NEW Zero Volt Relay Contact, to synchronize turning ON/OFF internal blower fan with remote exhaust fan.
- NEW Esco Sentinel™ Gold microprocessor with integrated temperature-compensated airflow monitoring system.
- NEW Quickstart mode, to turn the blower and lights on/off, by moving the sash window to correct position.
- NEW RS 232 data output port enables remote monitoring of cabinet operating parameters.
- Unique Esco Dynamic Chamber™ plenum design delivers quiet, uniform airflow.
- Negative pressure plenum surrounds contaminated positive pressure plenum; no fabric bags are used.
- Dual, long-life ULPA filters (per IEST-RP-CC001.3), for supply and exhaust airflow.
- Ergonomically angled front improves reach and comfort.
- Frameless, shatterproof motorized sash is easier to clean, offers larger, unobstructed viewing area.
- Multi-piece tray components which lift and remove to provide easy access encourage surface decontamination and are autoclavable.
- The front sash is motorized for convenient one touch operation.
- Raised airflow grille maintains safety by preventing blockage.
- Transparent side windows, angled front, and reduced noise levels combine to create the most comfortable, well-lit cabinet in Esco's range.
- Esco ISOCIDE™ antimicrobial surface on all painted surfaces minimizes contamination.

EN12469

NordicSafe Class II Microbiological Safety Cabinet features glass sides to enhance visibility inside the work area. Model NC2-4L8, with optional support stand.

** Ultra low noise level achieved on 1.2 meter (4') model per EN12469 at open field condition.*

Operator, Product and Environmental Protection

Esco NordicSafe Class II Microbiological Safety Cabinets offer a premium level of operator, product and environmental protection with advanced technology at an economical price.NordicSafe Microbiological Safety Cabinets provide protection against Biosafety Levels 1, 2 and 3,and can be used for handling Biosafety Level 4, provided that the operator wears a positive pressure suit.

Containment and Protection

- A combination of a supply ULPA filter and an exhaust ULPA filter creates a fully integrated performance envelope for product, operator and environmental protection.
- Inflow of room air enters the front air grille to establish operator protection; room air does not enter the work zone, preventing product contamination.
- Raised armrest prevents the likelihood of inflow grille blocking by operator's arms.
- The inflow velocity, downflow velocity, air flow path and intake geometry are precision tuned and tested to create an optimum air curtain on the front aperture. This curtain maintains operator and product protection even in the unlikely event of a severe inflow or downflow imbalance that would compromise protection in a conventional cabinet.

Integrated Filtration System

Independent supply and exhaust filters provide 99.999% typical efficiency for particle sizes of 0.1 to 0.3 microns. NordicSafe filters meet the IEST-RP-CC001.3 recommended practice for ULPA performance (USA), and EN 1822 for H14 performance (EU).

- ULPA filters (per IEST-RP-CC001.3), are tested to a typical efficiency of >99.999% for 0.1 to 0.3 micron particles; these provide better filtration capability than conventional H13 HEPA filters that have a typical efficiency of > 99.99% for 0.3 micron particles.
- Modern separatorless mini-pleat filter construction maximizes the filter surface area to extend filter life and eliminate possible filter media damage by thin and sharp aluminum separators used in conventional HEPA filter construction.

Mini-pleat Separatorless Filter (left) vs. Conventional Aluminum Separator Filter (right)

Esco cabinets use Swedish Camfil Farr® mini-pleat filters without aluminum separators to increase filter efficiency, minimize the chance of leakage, and to prolong filter life. Filters include a lightweight aluminum frame for structural stability and elimination of swelling common to conventional wood frames.

- The filter assembly is constructed in accordance with EN1822 requirements for performance and fire retardant properties.
- The supply filter provides ISO Class 3 (per ISO14644.1) clean air to the work surface in a gentle vertical laminar flow for product protection.
- The exhaust filter traps biohazard particles acquired from the work surface before air is exhausted to the room, offering operator and environmental protection.
- The exhaust filter media is protected from mechanical damage by an integrated metal screen guard, which is absent from conventional HEPA filters.

Blower System

The NC2-L blower system is designed for high performance operation, maximum energy efficiency and minimal maintenance.

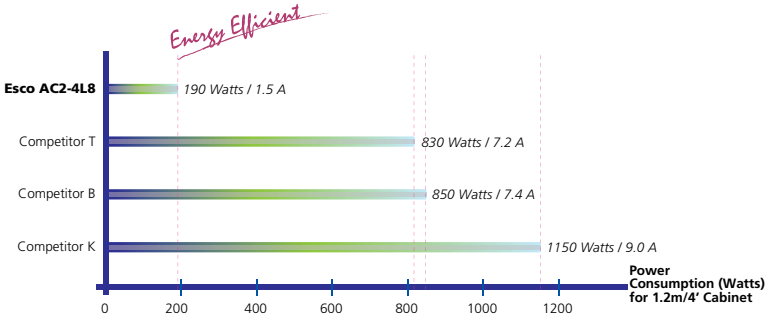
- Latest generation, energy efficient ECM blower from EBM-Papst Germany maintains constant airflow at low energy consumption (190 Watt).
- Quietest cabinet in industry (51 dBA), for serene working condition that helps to reduce fatigue and improves concentration
- An integral blower hour meter tracks operating life and aids in predictive maintenance planning.
- The external rotor motor design allows for optimum cooling of the motor during extended operations and extends the motor bearing life.
- To prevent fan damage, a paper-catch grille traps papers or towels that may drop down on the drain pan, preventing them from being pulled into the column by fan suction.

Sentinel™ Microprocessor Control, Alarm, Monitoring System

The Esco Sentinel™ microprocessor-based control system supervises operation of all cabinet functions.

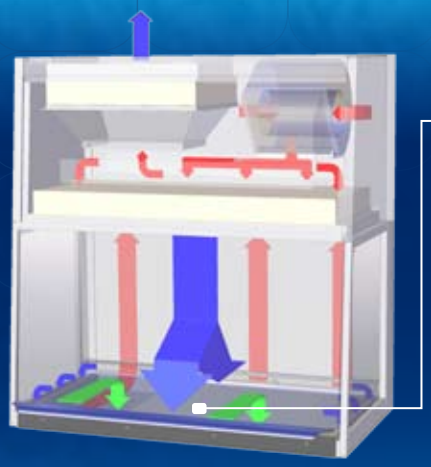
- The control panel is located on the center of the cabinet and is angled down for easy access by the operator.
- Continuous monitoring of cabinet airflow is displayed on a bright, easy-to-read LCD panel. The large display monitors operational parameters.

Save Energy, Money and the Planet!



Latest generation EBM-Papst Germany ECM fan technology replaces conventional fans. Improved energy efficiency dramatically lowers operating costs. Lower heat output further improves building energy efficiency.

Energy savings of up to US$600 per cabinet per year, based on average 600W savings on a 1.2m/4' cabinet, continuous operation, and electricity cost of US$0.10/kWH, plus additional savings from reduced building cooling load.



ULPA-filtered air
Unfiltered / potentially contaminated air
Room air / Inflow air

Cabinet Filtration System

Dynamic air barrier, inflow and forward-directed downflow air converge

- Ambient air is pulled through the perforations located towards the work zone front to prevent contamination of the work surface and work product. The inflow does not mix with the clean air within the cabinet work zone. Inflow air travels through a return path toward the common air plenum (blower plenum) at the top of the cabinet.
- The uniform, non-turbulent air stream protects against cross contamination within and throughout the work area.
- Near the work surface, the downflow air stream splits with a portion moving toward the front air grille, and the remainder moving to the rear air grille. A small portion of the ULPA filtered downflow enters the intake perforations at the side capture zones at a higher velocity (small blue arrows).
- A combination of inflow and downflow air streams forms an air barrier that prevents contaminated room air from entering the work zone, and prevents work surface emissions from escaping the work zone.
- Air returns to the common air plenum where the 33% exhaust and 67% recirculation process is continued.

- True temperature-compensated airflow velocity sensors provide independent measurement of inflow and downflow velocities despite room temperature fluctuation.
- All electronic parts are contained inside a plug-and-play module that permits easy exchange if required.
- Microprocessor software updates are available from Esco for download via the Internet.

Consult your Esco Operating Manual or contact Esco or your Sales Representative for information on user-preference programming capabilities built into the Sentinel microprocessor platform.

Cabinet Construction

Robust construction and enhanced safety features qualify the cabinet for the most demanding laboratory applications. The cabinet is fully assembled and ready to install and operate when shipped.

- The cabinet work zone has no welded joints to collect contaminants or rust.
- All stainless steel work surfaces are accessible for cleaning.
- Work zone back wall is manufactured from powder coated steel, which eliminates glare associated with stainless steel.
- Multi-piece tray components lift and remove to provide easy access and to encourage surface decontamination.
- A recessed central area and drain pan channels spills and prevents liquids from entering the lower filtration and blower systems.
- There are no screws on the front or sides to trap contaminants or complicate cleaning.
- External and internal surfaces are coated with Esco Isocide™ antimicrobial coating to protect against surface contamination and inhibit bacterial growth. Isocide eliminates 99.9% of surface bacteria within 24 hours of exposure.

Service Fitting Access

The cabinet is prepared for easy installation of optional gas and vacuum fittings; see Accessories.

- Optional service fittings openings are offset for easier access.

Comfortable Ergonomic Design

The cabinet is engineered for comfort, utility value and safety.

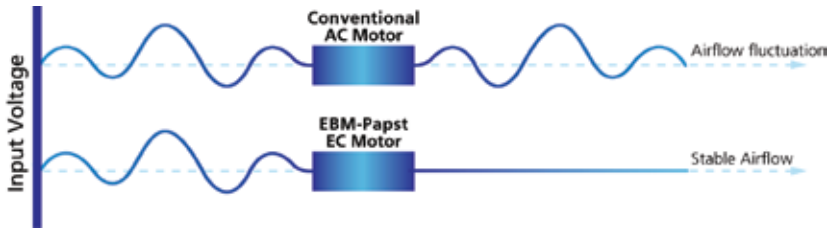
- The angled viewing window and narrow profile front grille improve reach into the work area.
- The instant-start 5000k fluorescent lamp operates on an electronic ballast to reduce heat, improve comfort and conserve energy.
- The lamp delivers uniform lighting to the work surface for greater comfort, reduced glare and improved productivity; see Specifications.
- The front armrest is raised above the work zone to improve comfort and to minimize blockage of forward airflow perforations.
- The optional adjustable support stand provides work surface height control.
- The frameless sash eliminates operator's line of sight blockage.
- The motorized window can be fully opened to insert and remove larger instrumentation and equipment.

Electrical Safety and Certification

All components meet or exceed applicable safety requirements.

- Each cabinet is individually factory tested for electrical safety.

Stable Airflow provided by EBM-Papst EC Motor



The Esco NordicSafe uses latest generation EBM-Papst EC Motor (ECM) to maintain stable airflow despite building voltage fluctuations, thereby assuring constant face velocity and downflow for optimum safety, containment and protection.

A graphical interface indicates cabinet performance.

Digital read-out with alpha-numeric display indicates all input, status and alarm functions.

All functions can be user activated through touch-pad programming access; see Operations Manual.

Touchpad data entry buttons permit control settings and access to diagnostics, default settings and hierarchical menus.

Diagnostics button, to easily check the cabinet operating parameters and assist servicing.

Color coded indicator lamps display green for primary function (fan operation); blue for secondary function (fluorescent lights and electrical outlet); and orange for caution (UV lamp ON).

Programmable automatic UV light timer simplifies operation, enhances contamination control, extends UV lamp life and saves energy.

Sentinel™ Gold Microprocessor Control System, Programmable — *When programmed ON*

- *the start-up sequence confirms status with Air Safe and local time display.*
- *the Personal Identification Number (PIN) access restricts unauthorized adjustments.*
- *an airflow alarm warns of deviations from normal velocities.*

- Documentation specific to each cabinet serial number is maintained on file.
- Tested to major world standards for microbiological safety cabinets, including the EN 12469.
- Contact Esco or your Sales Representative for site preparation information; see Electrical Specifications.

Warranty

NordicSafe NC2-L Series cabinets are warranted for 3 years excluding consumable parts and accessories.

- Each cabinet is shipped with a comprehensive User's Manual complete with a report documenting all test procedures.
- Additional IQ/OQ documentation is available upon request.
- Contact your local Sales Representative for specific warranty details or documentation requests.

Accessories and Options

Esco offers a variety of options and accessories to meet local applications. Contact Esco or your local Sales Representative for ordering information.

Support Stands

- Fixed height with casters (SPC)
  - Available 711 mm (28") or 860 mm (34")
- Fixed height with leveling feet (SAL)
  - Available 737 mm (29") or 838 mm (33"), ±38.1 mm (1.5")
- Hydraulic motorized adjustable height with casters (SPM)
  - Nominal range 711 mm (28") to 864 mm (34")
- Telescoping height with casters (STC)
  - Nominal range 660 mm (26") to 880 mm (34.6")
  - Adjustable in 25.4 mm (1") increments
- Telescoping height with leveling feet (STL)
  - Nominal range 660 mm (26") to 960 mm (37.8")

Electrical Outlets and Utility Fixtures

- Electrical outlet, Ground Fault Circuit Interrupter, North America
- Electrical outlet, Europe / Worldwide
- Petcock (air, gas, vacuum)
  - North America (American) style

Robust Cabinet Construction and Enhanced Safety Features

Service fixtures are offset for easier reach. Standard cabinets include two fixture provisions on each sidewall (one provision on each sidewall for 0.9 meter/3 ft. cabinet).

- *Helpful for certifiers, the hinged maintenance assembly opens to a fixed position on integrated, stainless steel struts providing front service access.*
- *All key components, with the exception of the blower/motor assembly, are mounted outside the air stream and away from contaminated air to permit service without decontamination. These include fluorescent lamps, electrical harnesses, electronic boards and microprocessor control.*
- *Panels enclosing microbiologically or electrically hazardous areas are color-coded red to warn service technicians.*
- *The telescoping Dynamic Chamber™ plenum minimizes physical lifting and accelerates filter change when required.*
- *Work area containment is maintained even when removable components are lifted out for cleaning.*
- *The multi-piece stainless steel work tray edges are radiused and easy to clean without crevices or joints.*
- *The lower drain trough is a single-piece fabrication with wide open angles and a channel to direct spills to the drain.*
- *The closed sidewall contains no perforations, air return slots or other hidden areas where contaminants can accumulate.*

Dynamic Chamber™ Plenum Design

Negative pressure *Positive pressure*

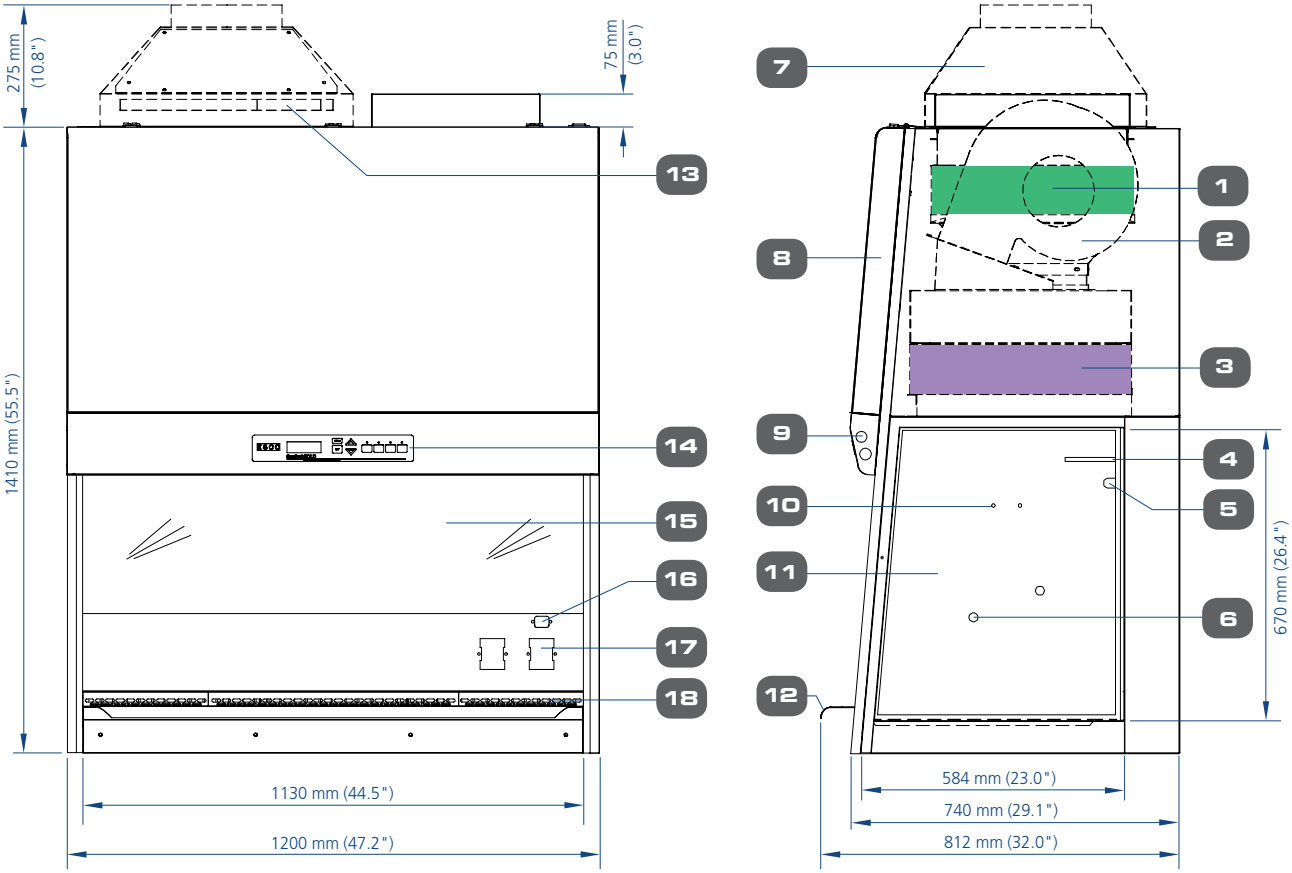
The Esco double-wall design creates a Dynamic Chamber plenum which surrounds contaminated areas with negative pressure, preventing the possibility of contamination from leaks in filter seal, gasket or cabinet structure.

- Europe / Worldwide style DIN 12898, DIN 12919, DIN 3537

Cabinet Accessories

- Germicidal UV lamp
  - Controlled by automatic UV lamp timer through Sentinel™ micro-processor control panel
  - Emission of 253.7 nanometers for most efficient decontamination
- PVC armrest
  - Chemically treated, improves operator comfort, easy to clean.
- Ergonomic lab chair
  - Laboratory grade construction, meets Class 100 cleanliness; alcohol resistant PVC materials
  - Adjustable height 395-490 mm (15.6"-19.3")
- Ergonomic foot rest
  - Angled, helps maintain proper posture
  - Adjustable height
  - Anti-skid coating, chemical resistant finish
- IV bar, with hooks
  - Stainless steel construction
  - Available for all standard Esco cabinets
- Microscope viewing device
  - Mounting and viewing pouch integrated into sash. Factory installed; specify when ordering.

NordicSafe NC2, Class II Microbiological Safety Cabinet Technical Specifications



1. *Exhaust ULPA filter*
2. *Blower*
3. *Downflow ULPA filter*
4. *Downflow sensor*
5. *Standard UV light Retrofit Kit provision*
6. *Plugged service fixtures provisions (2 on each side)*
7. *Exhaust Collar (Optional)*
8. *Electrical / Electronics panel*
9. *Fluorescent lamps*
10. *Standard IV bar Retrofit Kit™ provision*
11. *Tempered side glass*
12. *Stainless steel arm rest*
13. *Exhaust sensor*
14. *Esco Sentinel™ Gold microprocessor control system*
15. *Safety glass motorized sash window*
16. *Female IEC inlet for UV provision*
17. *Standard electrical outlet Retrofit Kit provision*
18. *Stainless steel multi-piece work tray*

General Specifications, NordicSafe Class II, Microbiological Safety Cabinets

Model		NC2-4L8
Nominal Size		1.2 meters (4')
External Dimensions (W x D x H)	Without Base Stand	1200 x 812 x 1410 mm (main body) 47.2" x 32.0" x 55.5"
	With Optional Base Stand, 711 mm (28") type	1200 x 812 x 2196 mm 47.2" x 32.0" x 86.5"
Internal Work Area, Dimensions (W x D x H)		1130 x 584 x 670 mm 44.5" x 23.0" x 26.4"
Internal Work Area		0.44 m^2 (4.7 sq.ft)
Tested Opening		173 mm (6.8")
Working Opening		200 mm (7.9")
Average Airflow Velocity	Inflow	0.45 m/s (90 fpm) at initial setpoint
	Downflow	0.32 m/s (65 fpm) at initial setpoint with uniformity of better than +/- 20%
Airflow Volume	Inflow	317 m^3/h (187 cfm)
	Downflow	703 m^3/h (414 cfm)
	Exhaust	317 m^3/h (187 cfm)
	Required Exhaust With Optional Thimble Exhaust	479 m^3/h (282 cfm)
	Static Pressure For Optional Thimble Exhaust Collar	28 Pa / 0.11 in H_2O
ULPA Filter Typical Efficiency	Downflow	>99.999% at 0.1 to 0.3 microns and MPPS as per IEST-RP-CC001.3 USA with H14 rating as per EN 1822, Europe
	Exhaust	
Typical Sound Emission per EN 12469*		51 dBA
Fluorescent Light Intensity At Zero Ambient		>1250 Lux (>116 foot candles)
Cabinet Construction	Main Body	1.2 mm (0.05") 18 gauge electrogalvanized steel with white oven-baked epoxy-polyester Isocide antimicrobial powder coated finish
	Work Surface	1.5 mm (0.06") 16 gauge stainless steel, type 304, with BA finish
	Side Walls	UV absorbing tempered glass, 5 mm (0.2"), colorless and transparent
Electrical 220-240V, AC, 50Hz, 1Ø	Cabinet Power / Amp at Normal Speed	190 W / 1 A
	Cabinet Power / Amp at Half Speed	80 W / 0.4 A
	Outlet Amp Fuse	5 A
	Full Load Amps	7 A
	BTU/ Hr	1122
Net Weight**		248 kg (547 lbs)
Shipping Weight**		300 kg (661 lbs)
Shipping Dimensions, Maximum (W x D x H)**		1430 x 820 x 1800 mm 56.3" x 32.3" x 70.8"
Shipping Volume, Maximum**		2.11 m^3 (75 cu.ft.)

** Noise reading in open field condition / anechoic chamber.*
*** Cabinet only; excludes optional stand*

Standards Compliance	For Microbiological Safety Cabinets	For Air Quality	For Filtration	For Electrical Safety
	EN 12469, Europe	ISO 14644.1 Class 3, Worldwide AS 1386 Class 1.5, Australia JIS B9920 Class 3, Japan	EN-1822 (H14), Europe IEST-RP-CC001.3, Worldwide IEST-RP-CC007.1, Worldwide IEST-RP-CC034.1, Worldwide	IEC 61010-1, Worldwide EN 61010-1, Europe UL 61010-1, USA CAN/CSA-22.2, No.61010-1

Biological Safety Cabinets
Cleanroom Products
Compounding Pharmacy Equipment
Containment / Pharma Products
CO_2 Incubators
Ductless Fume Hoods
In-Vitro Fertilization Workstations
Lab Animal Research Products
Laboratory Fume Hoods
Laboratory Ovens and Incubators
Laminar Flow Clean Benches
PCR Products
Ultralow Freezers

Since 1978, Esco has emerged as a leader in the development of controlled environment, laboratory and cleanroom equipment solutions. Products sold in more than 100 countries include biological safety cabinets, cleanroom products, compounding pharmacy equipment, containment / pharma products, ductless fume hoods, in vitro fertilization workstations, lab animal research products, laboratory fume hoods, laboratory ovens and incubators, laminar flow clean benches and PCR products and instrumentation. With the most extensive product line in the industry, Esco has passed more tests, in more languages, for more certifications, throughout more countries than any biosafety cabinet manufacturer in the world. Esco remains dedicated to delivering innovative solutions for the clinical, life science, research and industrial laboratory community. www.escoglobal.com.

Biological Safety Cabinets and Laminar Flow • Laboratory Fume Hoods • Laboratory Ovens
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